

The Examiner asserts that scandium, erbium, and ytterbium are equivalent elements because Watson lists each of scandium, erbium, and ytterbium as $L1_2$ forming elements. The Examiner then concludes that it would be obvious to substitute both erbium and ytterbium for scandium to achieve the claimed composition because scandium, erbium, and ytterbium are equivalent elements.

Respectfully, Appellant disagrees that scandium, erbium, and ytterbium are equivalent elements that can be substituted for each other without regard for other factors as the Examiner seems to suggest. That is, the atomic interactions of the composition of Watson appear to be somewhat more complex than the subject rejection appreciates. For instance, aluminum and scandium of the aluminum alloy of Watson are arranged in a 3-dimensional matrix known as a lattice structure. The lattice structure includes dimensions between atomic elements known as lattice parameters, such as distances between corners of a cubic lattice structure (see generally col.2, lines 12-31). The atomic elements of the particles in the aluminum alloy are also arranged in a lattice structure. According to Watson, there are drawbacks if the lattice parameters of the aluminum alloy matrix are too different from the lattice parameters of the particles (col.2, lines 12-34). Thus, Watson appears to teach aluminum-scandium alloy compositions having compatible amounts of the various chemical elements to avoid the given drawbacks.

The compositions of Watson overcome the given drawbacks by using a modifying element selected from magnesium, silver, zinc, copper, or lithium in the alloy to modify the lattice parameters of the aluminum-scandium matrix. For instance, Table I in Watson lists the changes in the lattice parameters of the matrix that are expected from the addition of each given element. Thus, there appears to be atomic interactions between the aluminum-scandium of the matrix and the modifying element that results in modification to the lattice parameter of the matrix.

The teachings of Watson do not appear to extend to compositions that do not include scandium. For example, the given problem and solution of Watson are presented with reference to an aluminum-scandium alloy (col.2, lines 12-38) and each of the additional specific example compositions in Watson includes scandium (col.4, lines 7-22). Therefore, Watson seems to suggest that the atomic interactions of the modifying elements would only be effective in aluminum alloys having scandium. Thus, even though scandium, erbium, and ytterbium are listed as $L1_2$ forming elements, one of ordinary skill in the art would not appear to expect that the modifying elements would be effective if scandium were replaced with erbium and ytterbium as

the Examiner proposes because scandium seems to be necessary for atomically interacting with the modifying elements to achieve the modifying effect.

Therefore, Watson teaches that scandium is irreplaceable, and does not teach that erbium and ytterbium are equivalents that may be substituted for scandium as the Examiner suggests. For at least this reason, Applicant respectfully requests that the rejection be withdrawn.

Claims 1-5, 7, 8, 10-16, and 27-29 were rejected under §103(a) as being unpatentable over Higashi. The Examiner asserts that the composition of the Higashi reference having up to 10wt% of rare earth elements is close enough to the claimed composition of greater than 10wt% that one of ordinary skill in the art would have expected these ranges to have the same properties. The Examiner relies on *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) to establish obviousness of close ranges.

Respectfully, Applicant disagrees with the Examiner's conclusion and reliance on *Titanium Metals Corp.* because Higashi teaches away from using an amount of rare earth elements that is greater than 10wt%. In *Titanium Metals*, there was no evidence establishing that the close ranges were not equivalent. In absence of such evidence, the court concluded that the ranges were equal. In contrast, Higashi provides evidence of non-equivalence by teaching away from using an amount of rare earth element that is greater than 10wt% (col. 2, lines 46-47). Thus, the *Titanium Metals Corp.* case does not apply in the instant rejection to establish obviousness because there is evidence in Hagashi that the ranges are not equal. For this reason, Applicant respectfully requests that the rejection be withdrawn.

Claims 1-3, 7-12, 15, 16, 26, and 27 were rejected under §103(a) as being unpatentable over EP '911. The Examiner argues that the claimed minor alloy elements are inherently included as impurities in the composition of EP '911. The Examiner previously pointed to "Aluminum and Aluminum Alloys," page 639, which lists various elements that are commonly found as impurities in aluminum alloys.

Respectfully, Applicant disagrees with the rejection because impurity elements should not be interpreted as being equivalent to the claimed elements. The claims recite "at least one minor alloy element" in the claimed composition. The term "alloy element" infers that the presence of the element in the composition is intended. The term "alloy element" also infers that the element is present in an amount suitable to contribute to the properties of the alloy. In contrast, impurity elements are not intended to be present within the composition in any appreciable amount that

affects the properties of the alloy. Indeed, manufacturers typically take measures to remove impurity elements. Therefore, an impurity element should not be interpreted as being equivalent to the claimed minor alloy element. By interpreting the claimed minor alloy element as an impurity element, the Examiner has effectively read this claim limitation out of the claim. Accordingly, Applicant respectfully requests that the rejection be withdrawn.

Claims 5 and 6 were rejected under §103(a) as being unpatentable over Watson in view of Higashi. As discussed above, independent base claim 1 is not obvious over Watson. The Examiner relies on the Higashi reference for teaching certain amounts of yttrium. Therefore, adding the teachings of Higashi does not resolve the above-noted defects of Watson. For at least this reason, Applicant respectfully requests the rejection be withdrawn.

Applicant believes that no additional fees are necessary, however, the Commissioner is authorized to charge Deposit Account No. **21-0279** in the name of United Technologies Corporation for any additional fees or credit the account for any overpayment.

Respectfully submitted,

CARLSON, GASKEY & OLDS

/Matthew L. Koziarz/

Matthew L. Koziarz, Registration No. 53,154
400 W. Maple, Suite 350
Birmingham, MI 48009
(248) 988-8360

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